

DESIGN CULTURE(S)

Cumulus Conference Proceedings Roma 2021

Volume #2

ARTIFICIAL ARTIFICIAL
LANGUAGES LIFE

LIFE LIFE LIFE

MAKING MAKING

NEW NORMAL

MULTIPLICITY

PROXIMITY P

RESILIENCE

REVOLUTION

THINKING THINKING

**Design Culture(s)
Cumulus Conference
Proceedings Roma 2021**

Volume #2

Editors

Loredana Di Lucchio
Lorenzo Imbesi
Angela Giambattista
Viktor Malakucz

Layout and Graphic Design

Viktor Malakucz
Concept for Cumulus
Conference Proceedings
Series was developed in
2018 by Jani Pulkka

Cumulus conference

Design Culture(s)

hosted by

Sapienza University of Rome, Italy
on June 8-11, 2021.

Conference website:

www.cumulusroma2020.org

Published by Cumulus

Cumulus the Global Association of
Art and Design Education and
Research. Aalto University, School
of Arts, Design and Architecture
PO BOX 31000, FI-00076 Aalto
www.cumulusassociation.org

Copyright © 2021

Sapienza University of Rome,
Cumulus Association,
Aalto University.

All content remains the property of
authors, editors and institutes.

ISBN 978-952-64-9004-5 (PDF)

ISSN 2490-046X

Cumulus Conference Proceedings
Series, N°7

**Cumulus Conference
Proceedings Series**

Editor-in-Chief

Cumulus President
Mariana Amatullo

Publications in the Series

- 01/17 Kolding,
REDO
- 02/17 Bengaluru, Letters
to the Future
- 03/18 Paris, To get there:
designing together
- 04/18 Wuxi, Diffused Transition
& Design Opportunities
- 05/19 Rovaniemi, Around the
Campfire – Resilience
and Intelligence
- 06/19 Bogotá, The Design
After
- 07/21 Rome, Design Culture(s)
Volume #1, Volume #2

DESIGN CULTURE(S)

Cumulus Conference Proceedings Roma 2021

Volume #2

Cumulus Conference
Proceedings Series

Cumulus the Global Association
of Art and Design Education and Research

Rome 2021

DE
SIGN
CULT
URE (S)

ROMA **2021**

JUNE 08.09.10.11
CUMULUS CONFERENCE



DESIGN CULTURE(S) | CUMULUS ROMA 2021
JUNE 08.09.10.11, SAPIENZA UNIVERSITY OF ROME

Materials Designers. Boosting Talent towards Circular Economies

Laura Clèries^{*a}, Valentina Rognoli^b,
Pere Llorach-Massana^a

^aElisava Barcelona School of Design and Engineering, La Rambla 30-32. 08002 Barcelona, Spain

^bDesign Department, Politecnico di Milano, Campus Bovisa - via Durando 38/a 20158 Milano, Italy

*lcleries@elisava.net

Abstract | Materials designers is an emergent professional profile which has its roots in the maker movement and whose role can have a positive impact in the development of a circular economy. As preliminary research for the development of the MaDe (Materials Designers) European project, a qualitative analysis was performed in order to identify the specific needs, opportunities and skill gaps for materials designers training and exposure, as well as for the requirements for enhancing social and industrial awareness towards circular economy issues. Based on the collected data from existing materials-related design projects, educational programs and existing initiatives, a series of recommended key-actions have been developed to define a European project that boosts creative talent towards circular economies.

KEYWORDS | MATERIAL DESIGNERS, CIRCULAR ECONOMY, CIRCULAR DESIGN, DESIGN SKILLS, EUROPEAN PROJECT

1. Introduction

The transition towards a more circular economy ((European Commission, 2015) brings great opportunities for Europe and its citizens. It is closely interlinked with crucial EU priorities on jobs and growth, investments, the social agenda and industrial innovation. The European Commission has promoted an ambitious program on Circular Economy by establishing "a common EU target for recycling 65% of municipal waste by 2030; a common EU target for recycling 75% of packaging waste by 2030; a binding target to reduce landfilling to a maximum of 10% of municipal waste by 2030." To be achieved, these goals require the involvement of civil society in creating new opportunities for materials to be used as resources for local production, and by establishing new supply chains between SMEs and industries at the city and regional levels.

Circular economy starts at the very beginning of a product's life. Both the design phase and production processes have an impact on sourcing, resource use and waste generation throughout a product's life. This circular design approach can make products more durable or more comfortable to repair, upgrade or remanufacture. It can help recyclers to disassemble products in order to recover valuable materials and components. Overall, it can help to save precious resources. Circular Design involves Service Design, Product Design and Materials Design. Most materials have an infinite life cycle. They can be reused, reformed and redesigned with a new purpose. By harnessing the unexplored potential of materials, we can implement social, economic, environmental and political change through a cross-sector approach.

Designers will play a strategic role in this transition. New industrial niche markets are developed, and new multidisciplinary creative professional profiles are spontaneously emerging. Designers and creatives are called for a more responsible role on the advancement of society, and the industry is starting to appreciate the several facets that designers can have thanks to their creative skills: designers are also changing agents, problem solvers, anthropologists, technologists, culture influencers, and environmental agents (World Economic Forum, 2016)). Design is a transversal creative discipline that can dialogue with materials science, information science and social sciences, amongst others, in order to address environmental and societal issues. Design, art and culture are driving forces to bring environmental perspectives to life in an attractive, innovative and human-centred way, such as in the European Green Deal (European commission, 2020).

More specifically, materials and material-driven design (Karana et al., 2015) have emerged as an essential driver in the transition to the circular economy (3). Studies show that more than three out of four decisions influencing the final choice of materials and manufacturing processes are made during the design phase whilst over 80% of the ecological and economic costs are made before the object is created. Design and materials have a pivotal influence on the way that products and services are made and used – they are, therefore, a crucial element in a shift towards more resource-efficient economy (Whicher, 2015).

In a time where there is this need for a more responsible role of design into environmental, technological and social issues, new designers' profiles that are aware and embody their work with the immediate and far-future concerns, emerge. In the last decades, the domain of design materials has been increasingly studied and developed due to technological advances that broadly expanded the capability to operate on the materials and due to more and more attention to sustainability issues. Remarkably, the dissemination of the Maker culture through the FabLabs and the diffusion of the do-it-yourself phenomenon changed the relationship between designers and materials, bringing designers to relate to production processes and materials manipulation. A specific emerging profile is that of materials designer, that merges circular design, materials experimentation, and new creative processes. This specialist material designer evaluates, ideates or develops materials and inspires approaches to manufacture materials for use in products that must meet specialized design and performance specifications. Some sector experts foresee Specialist Material Designers as a job of the future (Brownlee, 2016).

However, in its emerging role, industry and creative industries are not yet fully aware of the existence and potentiality of these new materials designers and how they could boost their adaptation to a circular economy. An analysis of needs, opportunities and skill gaps and the definition of key-actions to boost material designer profiles and social and industrial awareness is needed.

2. Methodology

Data of existing materials-related design projects, educational programs and existing initiatives have been collected at different levels: desk research, field research and expert sessions.

Desk Research: Extensive desk research has been performed under trends research methodologies that allow for the detection of emerging opportunities. Primary and secondary resources have been used: specialist literature (Journals (Ferrara, Rognoli, Arquilla, 2016), (Rognoli, Bianchini, Maffei & Karana, 2015), Books (Karana, Pedgley, Rognoli, eds., 2014), (Lee, 2015), (Solanki, 2018), Forecasting reports (Viewpoint Magazine), (Wunderman Thompson Intelligence, 2017), (Space10, 2017), Conferences (Chawla, 2017) and European Commission reports (European Commission, 2013), (European Commission, 2009) and existing European projects (Design and Advanced Materials) have been reviewed to provide an accurate analysis of the field and detect barriers, weaknesses and identify needs.

Field research: This desk research information has also been complemented with field research through visits and analysis of various Design Festivals (Dutch Design Week 2017, London Design Festival 2017).

Expert sessions: a co-creation session was performed between the three authors (partners of the MaDe project), counting on their expertise and their privileged position as observers of the reality in the area of new materials, design, and its impact onto the circular economy (The Materials Experience Lab, Elisava Master in Design through New Materials).

The process for analysis follows the Futures Research methodology: collecting the information through the mentioned channels, building the evidence wall, clustering of concepts, and cartographic categorization of results (Raymond, 2010).

3. Analysis

With all this collected and analysed information, the following opportunities and needs have been identified:

Opportunities

- Materials design is a new professional profile and an emerging discipline. Specialist Materials Designer is one of the seven jobs that will grow, according to design leaders at Frog, Ideo, Artefact, Teague, and more (Brownlee, 2016).
- Transversal impact on design disciplines. There is a huge opportunity for materials designers since materials span all the design disciplines with 'physical' production.
- Materials for a circular economy quality label. There is still no specific quality label for materials designers with a focus on the circular economy. There is an opportunity for a quality label such as an Award that contributes to a more responsible purpose of design (e.g. materials for circular economies), creating a label of creative talent, knowledge and positive environmental impact.
- Fostering new alliances. There is an opportunity to create early alliances between designers and material manufacturers or industrial producers to incubate radical design-led technology ideas and start-ups.

Needs

Overall Needs

- New creative revenues. Materials designers need to understand the new economic context and the ways to interact and sell their added value to industry; as well as to understand the alternatives to find new sources of revenue. They could be entrepreneurs, creative forecasters, or materials designers within an existing industry (El Taller Esfèric, in Spain, a materials-based start-up that needs support in understanding what kind of business model they can apply to their creations).

- A common vocabulary needs to be set in place. The different disciplines of design, engineering and materials science all have a different language to describe materials, and processes and this cannot bring together a constructive collaboration. There is an imperative need to develop a mutually understandable vocabulary of definitions and techniques so that they can begin to engage at a deeper level.
- A new creative sensorial approach. Materials have been historically considered from the engineering point of view, which leads to poor communication of their tactility, sensoriality, and creative possibilities. There is a need to communicate the realm of materials and materials design from a more creative and impacting approach. There is an emerging need to create a simplistically complex platform that can bring the nature of new materials in their many processed states to the design community.
- Systems thinking. There is a need to consider local identity, lifecycles and systems thinking, proposing an alternative approach to applying materials, encouraging a positive economic, environmental and social change, revealing the truth of how we live today and might live tomorrow.

Specific needs for creatives and designers

- Skill gaps. Addressing skills gaps appears often highlighted as a challenge in multiple policy papers in the domain of Cultural and Creative Industries (i.e. Design), Key Enabling Technologies (i.e. Advanced materials) or the Circular Economy: COM(2012) 537 final “Promoting cultural and creative sectors for growth and jobs in the EU”; COM(2016) 381 final “Working together to strengthen human capital, employability and competitiveness”; COM(2015) 614 final “Closing the loop - An EU action plan for the Circular Economy”; COM(2014) 446 final. “Green Employment Initiative: Tapping into the job creation potential of the green economy”; SEC(2009)501 final. “Design as a driver of user-centred innovation”. The Design Council (UK) has recently published “Designing a future economy. Developing design skills for productivity and innovation” (Design Council, 2017). This report catalogues the skills intricately connected to design and innovation. Design skills are the fusion of creativity with technical ability and interpersonal competencies and will be essential for any economy seeking to maximise the opportunities of technological advancements. Yet with these opportunities come significant challenges. The research, as mentioned earlier, shows that the UK has skills gaps and shortages in design and a narrowing pipeline of young designers who could otherwise fill these roles.

Specific needs for companies and industries

- Future-fit production. The industry is not aware of the existence and potentiality of these new materials-designers and how they could boost their adaptation to a

circular economy. There is a need to evaluate and certify new materials in order to introduce them to the value chain.

- Impacting message. There is a lack of common consensus in the language and opportunities that materials design is and can impact on. The industry is in need of a comprehensible language that they can adopt to be more aware of sustainability issues linked to materials.

Specific needs for Design Stakeholders and General Public

- New perspectives on sustainability. Associations, regional public bodies and NGO need to address from new perspectives the sustainability issue. There is a need to generate more dialogue between these design stakeholders and the designers and companies in order to understand the new context for the circular economy and how materials can address it.
- General awareness. Citizens need to understand how materials are the Trojan horse for sustainable solutions, becoming more aware of their consumer choices.

Skills gaps

These are the identified appropriate skills to become a Specialist Materials Designer:

1. Sectorial Transversality. Understanding the transversality of materials and connecting solutions from different industries.
2. Scientific and creative. Adopting a multidisciplinary view of materials, both from a creative and scientific approach.
3. Sustainability and circular economies. Understanding circular economies in the context of design and materials.
4. Hybrid of traditional and computerised skills. Mastering hybrid skills that bridge traditional craft techniques with technological innovation in the field of materials processing (3D printing; Computer-aided fabrication,...).
5. Locality. Understanding the potentiality of local materials knowledge and culture
6. Business models. Gaining new business models' knowledge that enables materials designers to envision alternative mainstream industry solutions and new sources of revenues.
7. Different production sectors. Understanding the different productive sectors, they can impact with their creations.
8. Hands-on experimentation. Adopting experimental methodologies and DIY techniques from other disciplines and bringing them into the creative ones.
9. Visual communication. Creating an attractive visual project to ensure high communication impact of any experimental creative project.

4. Results

Material Designers (MaDe) is a Creative Europe programme that addresses specific skills needs for designers within the circular economy paradigm. MaDe's approach considers materials design and materials making as a remarkable driving force behind innovation and responds to the question: What if we used creativity to provide better circular economy solutions through the ideation of new materials?

Based on the previous analysis and identification of opportunities, needs and skill gaps, a series of key actions have been defined and are the ones applied in the development of the MaDe project:

Objectives

The objectives of this programme are as follows:

1. To explore and obtain a better understanding on how can materials' design contribute to attain a more circular economy; providing thus tools, strategies, guides, contents, education, in order to enable designers (i.e. fashion, furniture, objects, packaging,...) and new creatives (i.e. materials designers) to connect to the industry.
2. To spot the European materials designers emerging scene in order to identify the most talented and promising creatives in this domain.
3. To provide 120 European students from different creative areas (design, arts, ...) with the appropriate skills to enhance their career as Specialist Materials Designers, which is foreseen 14 as a job of the future in the design industry.
4. To foster the career development and recognition of emerging materials designers through the circulation of their works, awards and professional stages in order to make them gain visibility among the industry, which is keen on incorporating a circular economy approach.
5. To connect new materials with designers and the industry through a digital platform that makes the tactility of materials come to life by enhancing the experience.
6. To ensure the broadest impact for MaDe's educational resources and primary outcomes through public presentation events to European industry (i.e. when main Design Weeks occur) and a proper communication and dissemination program.

Training

Workshop implementation is aimed at addressing Specialist Materials Designers skills gaps by training a selected group of 120 European designers and new creatives; and at generating a new breed of materials designers and 120 materials design projects to be displayed and

promoted. This training action addresses Specialist Materials Designers skills gaps and covers the need to gain a deep understanding of challenges for designers when approaching a more circular economy. In order to promote international cooperation capacity and foster exchange of experiences, the workshops take place in 3 different European cities and have a cooperative scheme with other material network stakeholders.

Material Network and Platform

A MaDe network is necessary to cover some of the identified needs. MaDe gathers two complementary academic partners: ELISAVA from Spain and POLIMI from Italy; and a disruptive design studio from the UK (Ma-tt-er). Partners pool expertise in the area of new materials, design, communication and its impact onto the circular economy with a complementary approach, which derives from the preliminary analysis of needs. Additionally, a network of other associated European design institutions reinforces talent spotting, skill training insights and transnational mobility. Dissemination of results and visualization of material designers towards the industry and the wider public needs the support and engagement in the network of other stakeholders that reach industry and professionals (FAD Spain, ADI Italia to name a few), and a platform that can reach society, such as the Ellen Macarthur Foundation. This platform works to inspire a generation to re-think, re-design and build a positive future circular economy. They have an educational department as well as a dissemination department, which includes the managing of the Disruptive Innovation Festival (DIF), and the generation of publications such as the Circular Design Guide together with IDEO.

An online platform will be key to connect multiple levels of agents and generating engagement from our target audiences and to disseminate the results of the project thus creating awareness regarding the importance of materials in the circular economy. This online platform has to aim at tackling the visual challenges of materials' tactility as well as providing a platform for new sources of revenues for designers.

Quality Label

There is a need to establish a quality label for material design, recognizing excellence. A MaDe Award should be the vehicle for this excellence recognition through each of the following categories: Best start-up potential / Best future vision / Best industry application.

The MaDe Award categories will be:

- (A) MaDe Award 1 - Best start-up potential.
- (B) MaDe Award 2 - Best future vision.
- (C) MaDe Award 3 - Best industry application.

The MaDe Award Jury, from the MaDe network, is a key factor for the dissemination and excellence of the Award. General and specific criteria for excellence of the MaDe Award is defined as follows:

General: Degree of innovation | Degree of creativity | Formal and Technical quality | Self-explanatory quality | Symbolic and emotional content | Number of potential applications, short or long term.

Specific for each category:

(A) A project with a high potential to become, in the short term, a materials-based start-up with a focus on the circular economy.

(B) A speculative materials project with an elevated future impact on society and industry in terms of the circular economy.

(C) A materials project that has a high potential to be applied, in the short term, in industry, initiating the transformation towards circular economy.

The MaDe Award prize consists of a fellowship to perform a stage into a Company or Institution and develop a materials design project.

Fellowships

The MaDe Awards grants the three winners with a unique opportunity to develop a materials design project in a professional environment and mentored by high-skilled tutors. The goals are to raise awareness on industry, companies and organisations for the need of materials designers professionals with a circular economy vision and to boost materials designers professional careers by introducing them to the industry.

The fellowship is a paid internship where each winning designer will develop a project at a different company/organisation and with different objectives depending on the category of the MaDe Award:

(A) MaDe Award 1 - Best start-up potential:

Objective: Stage in a business incubator to develop the final business model of their own company.

(B) MaDe Award 2 - Best future vision:

Objective: Stage in creative industry company or marketing department to develop a communication project that helps raise awareness on the importance of materials in the circular economy.

(C) MaDe Award 3 - Best industry application:

Objective: Stage in a Company to develop a joint capsule collection, promoting circular products in companies.

Exhibition

In order to cover the need to raise awareness among industry and the wider public towards materials design for circular economies and to give important visibility of the MaDe project to a broad audience an exhibition or showcase of the materials design projects is a key action to develop.

Key awareness messages

Another key action is to inform and explain how Specialist Materials Designers can contribute to a better circular economy and to disseminate a clear message for each different audience:

a) For creatives, designers:

- MaDe will provide you with key skills to promote your professional career in the design industry.
- By being present in the MaDe on-line platform, MaDe will help you to improve your visibility and chances for an extra communication channel and/or a future job opportunities.

b) For companies:

- They can be prepared for the future by incorporating materials adapted to a circular economy.
- They can improve the quality of their products thus their competitiveness into the market regarding the systematic use of design and a material-driven design approach.

c) For opinion leaders:

- To get a glimpse on the future of design, acknowledging the most disruptive designers.

d) For wider audiences:

- Design takes responsibility and provides more sustainable futures.

5. Conclusions

MaDe project results aim to provide a platform which recognizes the potential of designers and the material they could create across all creative sectors aiming at creating a circular economy. The combination of key actions such as Training, Network and platforms, Quality label and Awards, Fellowships and Exhibition aims at covering needs and skill gaps for material designers and industrial and societal awareness towards a circular economy. MaDe

project will showcase and demonstrate the positive impact that material designers can have across the industry which will kickstart the futures of those hoping to affect the European material landscape.

References

- D Brownlee, John (2016). "5 Design Jobs That Won't Exist In The Future". Fast Company. Retrieved from <https://www.fastcompany.com/3063318/5-design-jobs-that-wont-exist-in-the-future>
- Chawla, Purva (2017). What Industry Needs From the Individual: The Rise of the Material-Maker [Video]. YouTube. Retrieved from <https://www.youtube.com/watch?v=IXq9HTOqMJw>
- Design and Advanced Materials, DAMADEI <http://www.damadei.eu/>
- Design Council (2017). Designing a Future Economy. Retrieved from <https://www.designcouncil.org.uk/resources/report/designing-future-economy-report>
- European Commission (2015). Closing the loop - An EU action plan for the Circular Economy. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614>
- Ellen MacArthur Foundation and IDEO (2018). Circular Design Guide. Retrieved from <https://www.circulardesignguide.com/>
- European Commission (2009). Design as a driver of user-centred innovation. Retrieved from https://ec.europa.eu/growth/content/design-driver-user-centred-innovation_en
- European Commission (2013). Implementing an Action Plan for Design-Driven Innovation. Retrieved from https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1541431511.pdf
- European Commission (2020). A new European Bauhaus: op-ed article by Ursula von der Leyen, President of the European Commission. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/AC_20_1916
- Ferrara M., Rognoli V., Arquilla V. (2016). "ICS_Materials: materiali interattivi, connessi e smart". MD Journal [2]
- Karana E., Pedgley O., Rognoli V., eds. (2014). Materials Experience: Fundamentals of Materials and Design. Oxford: Butterworth-Heinemann
- Karana E, Barati B., Rognoli V., Zeeuw van der Laan A. (2015). Material driven design (MDD): A method to design for material experiences. In: *International Journal of Design*, 9(2), pp.35-54.
- Lee, J. (2015). Material Alchemy. Amsterdam: BIS Publishers
- Raymond, M. (2010). The Trend Forecaster's Handbook. London: Laurence King Publishing.
- Rognoli V., Bianchini M., Maffei S., Karana E. (2015). "DIY Materials". Materials and Design [86]

Solanki, S. (2018). *Why materials matter: responsible design for a better world*. Munich: Prestel

Space10 (2017). *Imagine*. Retrieved from <https://space10.com/collection/imagine/>

Viewpoint Magazine, <http://view-publications.com/>

Whicher, Anna (2015). "Creating a design action plan for a circular economy". *Design From Europe*. Retrieved from <http://designforeurope.eu/news-opinion/creating-design-action-plan-circular-economy>

World Economic Forum (2016). *The Future of Jobs*. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf

Wunderman Thompson Intelligence (2017). *The Future 100: 2018 - Trends and Change to Watch in 2018*. Retrieved from <https://intelligence.wundermanthompson.com/trend-reports/the-future-100-2018/>

About the Authors:

Laura Clèries Laura Clèries is a designer, strategic design researcher editor and curator in transformative innovation through design-led foresight and with additional focus on materials innovation. She is Director of Elisava Research and director of the Master in Design through New Materials.

Valentina Rognoli is Associate Professor in the Department of Design, Politecnico di Milano. She is a pioneer in the field of materials experience and DIY-Materials and has internationally recognized expertise on the topic both in research and education. Since 2015, she jointly leads the Materials Experience Lab.

Pere Llorach-Massana is an Industrial Design Engineer by Elisava and Doctor in Environmental Sciences by the UAB. He works at Elisava, where he is responsible for defining teaching content in design and sustainability; as well as managing and participating in different projects in the field of design and circular economy.

Acknowledgements: We acknowledge support from the Creative Europe programme.

ARTIFICIAL ARTIFICIAL
LANGUAGES LANGUAGES
LIFE LIFE LIFE LIFE
MAKING MAKING MAKING MAKING
NEW NORMAL NEW NORMAL
MULTIPLICITY MULTIPLICITY
PROXIMITY PROXIMITY
RESILIENCE RESILIENCE
REVOLUTION REVOLUTION
THINKING THINKING